AMENDMENTS TO THE CLAIMS

The following listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended) A crank angle detector, comprising:

a rotor rotated in association with a crank shaft of an internal combustion engine and including projections, every projection on said rotor being one of ~~having~~ a plurality of detection portions to be detected at equivalent angle intervals on the outer circumference of said rotor; and

a pickup arranged at the vicinity of the outer circumference of said rotor, said rotor [[for]] generating a pulse signal when said plurality of detection portions each pass therethrough;

wherein [[one]] a selected detection portion among said plurality of detection portions is located immediately before a crank angle corresponding to the ~~upper dead point~~ top dead center of a piston of said internal combustion engine, ~~of said plurality of detection portions is~~ said selected detection portion being set to detect a reference angle of the crank angle.

2. (Currently Amended) The crank angle detector according to claim 1, wherein ~~said plurality of detection portions are constructed by projections, respectively, and the one~~ said selected detection portion ~~for detecting said reference angle is set to~~ has a length in an outer circumferential direction of said rotor different ~~from~~ than the lengths of ~~the other~~ non-selected detection portions among said plurality of detection portions ~~in the outer circumferential direction of said rotor~~.

3. (Currently Amended) The crank angle detector according to claim 2, wherein ~~the one~~ said selected detection portion ~~for detecting said reference angle~~ is longer in the outer circumferential direction of said rotor than said ~~other~~ non-selected detection portions ~~in the outer circumferential direction of said rotor~~.

4. (Currently Amended) The crank angle detector according to claim 1,

wherein [[the]] respective rear end positions of [[the]] said plurality of detection portions are located at equivalent angle intervals in the rotating direction of said rotor, and

wherein [[the]] a length from [[the]] a rear end position to [[the]] a front end position of ~~the one~~ said selected detection portion ~~for detecting said reference angle~~ is different [[from]] than ~~the length~~ lengths from [[the]] rear end ~~position~~ positions to [[the]] front end ~~position~~ positions of non-selected ~~each of said other~~ detection portions among said plurality of detection portions.

5. (Currently Amended) The crank angle detector according to claim 4, ~~wherein, when the~~

wherein said respective rear end positions of [[the]] said plurality of detection portions are located at equivalent angle intervals of 15 degrees in the rotating direction of said rotor, and [[the]]

wherein a rear end of a detection portion passing through the vicinity of said pickup after ~~next to the one~~ said selected detection portion ~~for detecting said reference angle at a rotating time of said rotor~~ is located within a range of zero to ten degrees from the crank angle corresponding to said ~~upper dead point~~ top dead center.

6. (Currently Amended) An ignition timing controller, comprising:

a crank angle detecting means ~~rotated in association with a crank shaft of an internal combustion engine,~~ for generating a crank angle pulse signal for each rotation of a predetermined angle, and for generating the pulse signal immediately before the crank angle corresponding to the ~~upper dead point~~ top dead center of a piston of said internal combustion engine [[,]] as a reference pulse signal [[of]] having an aspect different ~~from that~~ than an aspect of ~~the other~~ non-reference crank angle pulse ~~signal~~ signals, said crank angle detecting means being rotated in association with a crank shaft of an internal combustion engine; and

an ignition control means for controlling ignition timing of said internal combustion engine in accordance with said crank angle pulse signal;

wherein in a period from when cranking of said internal combustion engine is started to when said crank shaft has completed one rotation, said ignition control means instructs spark discharge of an ignition plug of said internal combustion engine for the ignition timing in accordance with ~~said~~ a reference crank angle pulse signal generated immediately after said reference pulse signal ~~in a period until said crank shaft is rotated once after cranking of said internal combustion engine is started~~.

7. (Currently Amended) The ignition timing controller according to claim 6, wherein in the period from when cranking of said internal combustion engine is started to when said crank shaft has completed one rotation, said ignition control means controls electric supply timing to an

ignition coil in accordance with said reference pulse signal before the instruction of the spark discharge of said ignition plug ~~in the period until said crank shaft is rotated once after the cranking of said internal combustion engine is started~~.

8. (Currently Amended) The crank angle detector according to claim 6, wherein said crank angle detecting means comprises:

a rotor rotated in association with [[the]] said crank shaft of said internal combustion engine and including projections, every projection on said rotor being one of ~~having~~ a plurality of detection portions to be detected at equivalent angle intervals on [[the]] an outer circumference of said rotor; and

a pickup arranged at the vicinity of the outer circumference of said rotor, [[for]] said pickup generating said crank angle pulse ~~signal~~ signals when each of said plurality of detection portions [[each]] pass therethrough;

wherein [[one]] a selected detection portion among said plurality of detection portions is located immediately before the crank angle corresponding to the ~~upper dead point~~ top dead center of the piston of said internal combustion engine~~, of said plurality of detection portions~~ and is set to generate said reference pulse signal, and

wherein the respective rear end positions of the plurality of detection portions are located at equivalent angle intervals in the rotating direction of said rotor, and [[the]] a length from [[the]] a rear end position to [[the]] a front end position of ~~the one~~ said selected detection portion ~~for generating said reference pulse signal~~ is different than ~~from the length~~ lengths from [[the]]

rear end ~~position~~ positions to [[the]] front end ~~position~~ positions of ~~each of said other~~ non-selected detection portions among said plurality of detection portions.

9. (Currently Amended) The ignition timing controller according to claim 6 or 8,

wherein said crank angle pulse signal including said reference pulse signal is constructed by a negative pulse and a positive pulse constituting a pair, and

wherein said negative pulse is generated correspondingly to the front end of each of said plurality of detection portions, and said positive pulse is generated correspondingly to the rear end of each of said plurality of detection portions.

10. (Currently Amended) The ignition timing controller according to claim 9 ~~6 or 8~~, wherein said ignition control means discriminates said reference pulse signal in accordance with the magnitude of a ratio of ~~the generating~~ a generated interval between two of said negative pulses ~~pulse~~ and ~~the generating~~ a generated interval between two of said positive pulses ~~pulse~~.

11. (Currently Amended) The ignition timing controller according to claim 9 ~~6 or 8~~, wherein in the period from when cranking of said internal combustion engine is started to when said crankshaft has completed one rotation, said ignition control means instructs an electric supply to said ignition coil when a value ~~provided~~ obtained by dividing the ~~generating~~ generated interval between [[of]] said negative ~~pulse~~ pulses by the ~~generating~~ generated interval between [[of]] said

positive ~~pulse~~ pulses is ~~sufficiently~~ smaller than one, and ~~in the period until said crank shaft is rotated once after the cranking of said internal combustion engine is started, and then~~

wherein said ignition control means also instructs the spark discharge of said ignition plug when the value ~~provided~~ obtained by dividing the ~~generating~~ generated interval [[of]] between said negative pulses ~~pulse~~ by the ~~generating~~ generated interval between [[of]] said positive pulses ~~pulse~~ is ~~sufficiently~~ greater than one.